

CLAIMS

What is claimed is:

1. A spindle unit for a machine tool, comprising:
 - a drive unit having a drive shaft;
 - a spindle head assembly constructed for receiving a tool and having a hollow spindle head shaft driven by the drive unit;
 - a tie rod arranged for axial displacement in the hollow spindle head shaft and mechanically coupled with the drive shaft; and
 - a shifting unit for axially moving the drive shaft together with the tie rod.
2. The spindle unit of claim 1, wherein the spindle head assembly and the drive unit are detachably connected to one another, and wherein the drive shaft and the tie rod are detachably coupled to one another.
3. The spindle unit of claim 1, wherein the spindle head shaft has one end facing the drive shaft and constructed as a spline shaft, said drive shaft having an end face constructed as a hollow wheel to complement the one end of the spindle head shaft and to enable coupling therewith.
4. The spindle unit of claim 1, wherein the drive shaft has a central bore for transporting a material, said tie rod having a tube extending into the central bore and being removable therefrom.

5. The spindle unit of claim 1, wherein the tie rod has a central bore for transporting a material, said drive shaft having a tube extending into the central bore and being removable therefrom.
6. The spindle unit of claim 1, wherein the drive shaft is constructed in one piece with the tie rod.
7. The spindle unit of claim 1, wherein the drive unit includes an electric motor having a rotor mounted on the drive shaft.
8. The spindle unit of claim 7, wherein the electric motor includes a stator which completely surrounds the rotor independent of a displacement position of the shifting unit.
9. The spindle unit of claim 1, and further comprising an axially displaceable bearing assembly for support of the drive shaft.
10. The spindle unit of claim 9, wherein the drive shaft has opposite ends, said bearing assembly having a bearing sleeve for support of one end of the drive shaft, and another bearing sleeve for support of the other end of the drive shaft.

11. The spindle unit of claim 1, wherein the shifting unit is constructed for operation by one of hydraulic means, pneumatic means, and electromechanical means.
12. The spindle unit of claim 1, wherein during operation of the spindle unit, the shifting unit is controlled so as to cause the drive shaft to axially contact the tie rod, and further comprising a sensing device constructed for measuring an axial position of the drive shaft and thereby implementing an indirect measurement of an axial position of the tie rod.
13. A method for operating a spindle unit for a machine tool having a drive unit with a drive shaft and a spindle head assembly for receiving a tool with a tie rod, comprising the steps of:
 - shifting the tie rod in axial direction to a first position with the help of the drive shaft; and
 - moving the drive shaft backwards in axial direction to a second position, thereby also enabling a backward movement by the tie rod.
14. The method of claim 13, wherein during operation of the spindle unit the drive shaft axially bears upon the tie rod so as to allow indirect measurement of a position of the tie rod on the basis of ascertaining the position of the drive shaft.